Bending/drilling Acrylic

Excerpts from The Messageboards

Joe Pack asked: I need to make a few stands for pens, bottle stoppers, etc., modeled on pictures I find on the web. I am considering using acrylic, but have never worked with this stuff. Can I bend it by using a heat gun and letting gravity do its thing? What, if any, special considerations must I make to drill it without cracking?

John Lucas replied: Bending acrylic is easy. The best way is with a heating strip made for that purpose. I haven't looked for those in years so I don't even know where to tell you to go look. Possibly one of the craft stores. You can can bend it by heating it to around 400° in the oven. You'll have to lay it on something because it will take on the shape of the racks. When you pull it out lay it over a form. Depending on what you do you may need a positive and negative form to make it keep it's shape.

You can also bend it with a heat gun or propane torch but you have to be very careful. It's very easy to overheat it and cause bubbles. Try it on some scrap first. You can polish the edges with a propane torch but again this is pretty tricky and takes some practice. I use several grits of sandpaper followed by 4/0 wool and then followed by white rubbing compound or chrome bumber polish, and then regular wax.

Drilling is a different matter. They use specially ground drill bits. They are very long grinds not short ones like we use on wood and metal. Drill on slow speed so you don't burn the plastic. It always breaks just as the cutting tooth pulls through the bottom so go very very slow here. Feed rate should be slow and back out if you see any melting rather than cutting. I find it wants to lift the plastic. I haven't tried putting a sacrificial board on top (I always use one on the bottom). Possibly with these two clamped together would prevent damage. Another possibility is the hole cutters designed for sheet metal. They are tapered and you just push them in more if you want a bigger hole. They may still break the stuff when the first cut goes through. I just got one at the flea market a few months ago. If I can find my stash of plexiglass I'll try that this afternoon and let you know.

Gordon P of Sumner WA adds: Drilling is best when the paper covering is still on the acrylic. If not, use a piece of masking or duct tape to cover the area where you will be drilling. Also, drill very, very slowly, and use a brad point bit. Put a clean backer under the spot you will be drilling or you might get tar-shaped cracking!!

Grant Smith wrote: Back in my car stereo install days I worked with lots of acrylic. I had some luck bending it by heating it in an oven and on thinner stuff (⅛" or less or so) using a propane torch. Strip heaters are available through plastics suppliers or online, but I can't say much about that as I never bought one.

You can drill using ordinary machinists drill bits at a lower than normal speed and by clamping a sacrificial board to the back of it. This works great. Believe me I've drilled and countersunk thousands of holes in hundred dollar pieces of the stuff. I never bothered grinding the "flats" on the bit cutting edge and had no issues unless the plastic wasn't backed up.

You can also drill and tap a hole for screw threads using normal metalworking taps and techniques.